

Amendments to the Claims:

The following claims will replace all prior versions of the claims in this application (in the unlikely event that no claims follow herein, the previously pending claims will remain):

1-9. (Cancelled)

10. (Currently Amended) A photodetector integratable light coupling apparatus, comprising:

a substrate having a surface-illuminated photodetector mounted on a predetermined area thereof; and

an etch structure complex including:

a first anti-reflection surface that passes through incident light entering into the substrate;

a first total reflection surface coated so that the incident light may be totally reflected with a first predetermined angle and transmitted to the photodetector; and

a second total reflection surface for reflecting the light which is not absorbed into the photodetector, back to the photodetector, ~~transmitting the light, which is not absorbed into the photodetector and reflected back, to the photodetector,~~

wherein the light incident from outside passes through the first anti-reflection surface and is reflected from the first total reflection surface to be transmitted and absorbed into the photodetector, and

wherein the light, which is not absorbed into the photodetector and reflected, ~~passes through~~ is reflected from the second total reflection surface and is absorbed again into the photodetector.

11. (Currently Amended) The photodetector integratable light coupling apparatus according to claim 10, further comprising:

one or more total reflection surfaces for reflecting ~~transmitting~~ the light, which is not absorbed into the photodetector ~~and reflected back,~~ back to the photodetector.

12. (Currently Amended) The photodetector integratable light coupling apparatus according to claim 10, wherein at least one of the first total reflection surface and the second ~~the~~ total reflection surface is coated by any one of a metal layer, such as Au and Ag, a single dielectric thin film, such as SiO_x, SiN_x, CeO₂, CeF₃, SiO₂, TiO₂, MgF₂ and ZnS, and a multiple-layer composed of a combination thereof.

13. (Original) The photodetector integratable light coupling apparatus according to claim 10, wherein the anti-reflection surface is coated by any one of a single-layer, a double-layer and a multi-layer composed of a dielectric thin film, such as SiO_x, SiN_x, CeO₂, CeF₃, SiO₂, TiO₂, MgF₂ and ZnS.

14. (Original) The photodetector integratable light coupling apparatus according claim 10, wherein the substrate is an InP substrate.

15. (Original) The photodetector integratable light coupling apparatus according to claim 14, wherein the InP substrate in the etch structure complex is manufactured to have a sloping surface with a sloping angle according to a combination of an etching mask direction and an etching method using an HBr-based etchant or an HCl-based etchant.

16. (Original) The photodetector integratable light coupling apparatus according claim 10, wherein the etch structure complex is manufactured in the same epi-structure as the photodetector.

17. (New) A photodetector integratable light coupling apparatus, comprising:
a substrate having a surface-illuminated photodetector mounted on a predetermined area thereof; and

an etch structure complex including:

a first anti-reflection surface that passes through incident light entering into the substrate;

a first total reflection surface coated so that the incident light may be reflected with a first predetermined angle and transmitted to the photodetector;

a second total reflection surface for reflecting the light which is not absorbed into the photodetector, back to the photodetector; and

a third total reflection surface for reflecting the light which is not absorbed into the photodetector, back to the photodetector,

wherein the light incident from outside passes through the first anti-reflection surface and is reflected from the first total reflection surface to be transmitted and absorbed into the photodetector, and

wherein the light, which is not absorbed into the photodetector and reflected, is reflected from the second total reflection surface and is absorbed again into the photodetector.

18. (New) The apparatus of claim 17, wherein the third total reflection surface is configured to reflect the light received from the second total reflection surface and reflect the light back to the second total reflection surface so that the light can be reflected back to the photodetector.

19. (New) The apparatus of claim 17, wherein at least one of the first total reflection surface and the second total reflection surface is coated by any one of a metal layer, such as Au and Ag, a single dielectric thin film, such as SiO_x , SiN_x , CeO_2 , CeF_3 , SiO_2 , TiO_2 , MgF_2 and ZnS , and a multiple-layer composed of a combination thereof.

20. (New) The apparatus of claim 17, wherein the first total reflection surface and the second total reflection surface is coated by any one of a metal layer, such as Au and Ag, a single dielectric thin film, such as SiO_x , SiN_x , CeO_2 , CeF_3 , SiO_2 , TiO_2 , MgF_2 and ZnS , and a multiple-layer composed of a combination thereof.

21. (New) The apparatus of claim 17, wherein the anti-reflection surface is coated by any one of a single-layer, a double-layer and a multi-layer composed of a dielectric thin film, such as SiO_x , SiN_x , CeO_2 , CeF_3 , SiO_2 , TiO_2 , MgF_2 and ZnS .

22. (New) The apparatus of claim 17, wherein the substrate is an InP substrate.

23. (New) The apparatus of claim 21, wherein the InP substrate in the etch structure complex is manufactured to have a sloping surface with a sloping angle according to a combination of an etching mask direction and an etching method using an HBr-based etchant or an HCl-based etchant.

24. (New) The apparatus of claim 17, wherein the etch structure complex is manufactured in the same epi-structure as the photodetector.

25. (New) A photodetector integratable light coupling apparatus, comprising:
a substrate having a surface-illuminated photodetector mounted on a predetermined area thereof; and

an etch structure complex including:

a first anti-reflection surface that passes through incident light entering into the substrate;

a first total reflection surface coated so that the incident light may be reflected with a first predetermined angle and transmitted to the photodetector;

a second total reflection surface for reflecting the light which is not absorbed into the photodetector; and

a third total reflection surface configured to receive the light reflected from the second total reflection surface and reflect the light back to the second total reflection surface so that the light can be reflected back to the photodetector,

wherein the light incident from outside passes through the first anti-reflection surface and is reflected from the first total reflection surface to be transmitted and absorbed into the photodetector;

wherein the light, which is not absorbed into the photodetector and reflected, is reflected from the second total reflection surface and is absorbed again into the photodetector

26. (New) The apparatus of claim 25, wherein at least one of the first total reflection surface and the second total reflection surface is coated by any one of a metal layer, such as Au and Ag, a single dielectric thin film, such as SiO_x, SiN_x, CeO₂, CeF₃, SiO₂, TiO₂, MgF₂ and ZnS, and a multiple-layer composed of a combination thereof.

27. (New) The apparatus of claim 25, wherein the first total reflection surface and the second total reflection surface is coated by any one of a metal layer, such as Au and Ag, a single dielectric thin film, such as SiO_x, SiN_x, CeO₂, CeF₃, SiO₂, TiO₂, MgF₂ and ZnS, and a multiple-layer composed of a combination thereof.

28. (New) The apparatus of claim 25, wherein the anti-reflection surface is coated by any one of a single-layer, a double-layer and a multi-layer composed of a dielectric thin film, such as SiO_x , SiN_x , CeO_2 , CeF_3 , SiO_2 , TiO_2 , MgF_2 and ZnS .

29. (New) The apparatus of claim 25, wherein the substrate is an InP substrate.

30. (New) The apparatus of claim 29, wherein the InP substrate in the etch structure complex is manufactured to have a sloping surface with a sloping angle according to a combination of an etching mask direction and an etching method using an HBr-based etchant or an HCl-based etchant.

31. (New) The apparatus of claim 25, wherein the etch structure complex is manufactured in the same epi-structure as the photodetector.